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ABSTRACT

Developed by the ABCs of Construction National Workplace Literacy Project, these curriculum materials for the area of electrical and instrumentation contain three lessons that deal with getting meanings from context. Each lesson consists of an objective, instruction, and exercises. Lesson 1 contains 8 exercises, Lesson 2 has 10, and Lesson 3 has 7. The objectives for the lessons are for the student to be able to define unknown words by examining the familiar words that surround them, to use clues given by the author to define unknown words, and to define unknown words through examples in the sentence. (YLB)

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TECHNICAL DEVELOPMENT CENTER
ED 374 287
CE 067 225

Getting **Meanings** *From* **Context**

ELECTRICAL & INSTRUMENTATION

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Associated Builders & Contractors, Inc.
EBR Adult & Continuing Education

ABC's of Construction
National Demonstration Project in Workforce Literacy

The ABC's of Construction Project was funded in 1991 by the U.S. Department of Education as a grantee through the National Workplace Literacy Program (PR #198A10155). The program provided basic skills instruction to industrial construction workers employed by companies which are members of the Pelican Chapter of Associated Builders and Contractors (ABC). Located in Baton Rouge, Louisiana, ABC provides training to employees of over 60 member companies who perform contract work in the 58 petrochemical facilities located along the Mississippi River between Baton Rouge and New Orleans.

The grantee, the Adult Education Department of East Baton Rouge School Board, performed a comprehensive literacy task analysis of the apprenticeship training program for millwrights, pipefitters, electricians, instrumentation techs, and welders involved in the ABC training program. Over 20 modules of original, contextual curriculum were developed to teach the reading and math skills required for success in the craft training program.

Materials developed for instruction incorporated cognitive strategies for learning basic skills in the context of the craft and safety knowledge demanded by the industrial construction workplace. Instruction was written for a competency-based, open-entry/open-exit, individualized adult learning program that operated at the ABC training center in the evenings after work-hours.

OBJECTIVE

By the end of this lesson, you will be able to define unknown words by examining the familiar words which surround them.

INSTRUCTION

Have you ever seen an actor in a movie and thought, "I know this person! Where have I seen him before?" You may be home before you recall the actor stars in your favorite television show. You watch that show every week. You never miss it. Why did it take you so long to recall the actor?

You failed because he was not in the surroundings you normally see him. He was out of context. If he been in the same set or with familiar characters, you would have quickly recognized him.

You can use the same skills that let you identify television characters to define unknown words. That's because unknown words have contexts, too. These consist of the familiar words in the sentence. These words give clues. The clues help you define new terms.

How does this happen? Your mind holds many memories of many different topics. These are connected one-to-another. Your mind uses your memories to make predictions about the topic.

For example, consider the following tools: cable cutters, bolt cutters, and stripper cutters. You have many memories about cutters. Whenever you need a cutter, you use these memories to help you predict which onewill work best.

Just like you have memories about cutters, you have memories of words. To find meanings, you make connections between memories. When you see a word you don't know, you can use your knowledge of the words around it to help you figure out its meaning.

Examine the sentence below:

CONTRACT DOCUMENTS are the LEGAL executed documents of the CONTRACT and are enforceable by the LAW.

What does enforceable mean? You can predict its meaning by examining the words contract, documents, legal, and law. These words all pertain to your putting into writing the way you plan to do business. This written plan is a legal contract. You can guess that enforceable means the law can make you do what you say you will do.

CONCLUSION

Thus, the next time you see a word you do not know, consider the words around it. The first step in doing so is to read the paragraph or where it is found. You do this to make sure you are using the right memory connections. Next, you look for words in the sentence with the new word which seem to be about the same topic. Then reread the sentence or paragraph. Now you guess what you think the unknown word means. Your next step is to read the sentence with this meaning in mind. Does the it make sense? If so, you continue reading. Your definition may not be what you'd find if you looked the word up in a dictionary. But, it's good enough for you to understand the sentence. Often that's all the definition you need. If the sentence does not make sense, try again.

1 Exercise

Mark realizes that construction work can be unsafe. Then he reads his training manual. He discovers information he has not known.

> **The construction industry is one of the most dangerous industries in terms of the number and seriousness of accidents. There are two general types of injuries that are common to electricians in the trade: electrical and mechanical. Approximately one out of ten of these accidents is *fatal.* Because of the seriousness of these injuries, the electrical industry is one of the most dangerous of the construction industries.**

1. What does fatal mean?

_____

_____

2. Describe the process by which you arrived at this definition.

_____

_____

_____

_____

3. Provide an example of an electrical accident.

_____

_____

_____

_____

4. Provide an example of a mechanical accident.

2 Exercise

Jose has been told that there is one safety rule he should never break. He knows that breaking a rule can lead to job loss or reprimand. He reads his manual. He finds the following information:

> **One general safety practice that should be followed regardless of location or circuit voltage is absolutely necessary. From a safety standpoint, it is advisable to work as much as possible with the right hand. This is especially true when working with hot wires or circuits suspected of being defective. If you work with the right hand, the current is less likely to affect the heart since it would pass through the right side of the body.**

1. Describe an energized circuit. How do you know this?

_____

_____

_____

_____

2. What other name for an energized circuit is given in this passage?

_____

_____

_____

3. According to information in this passage, on what side of your body would you expect your heart to be?

_____

_____

_____

3 Exercise

Leroy is always taking short-cuts in his work. His boss has warned him time and time again that this is unsafe. Finally, the boss made Leroy reread a portion of his training manual.

When working alone, a worker often will take shortcuts in order to finish the job. More often than not, shortcuts create *hazardous* situations where equipment may be damaged or personnel injured. These short-cuts would not be necessary if two individuals were working on the same job. Thus, a buddy system will not only provide quick aid if an injury occurs, but will also help prevent the injury in the first place.

1. What does hazardous mean? Which words tell you this?

_____

_____

_____

2. Why might a worker be more likely to take short-cuts while working alone?

_____

_____

_____

3. List two ways working with a buddy makes work safer.

_____

_____

_____

_____

4 Exercise

Letticia will soon work in a hazardous location. She smokes. Her boss wants her to read some information. Here is the information she is given.

Three main safety points should be remembered when working in hazardous locations:

1. Always follow the established rules for the installation.

2. Use all the protective equipment supplied by the employer.

3. Know what to do in case of a fire or explosion.

The rules that have been established for in-house employees also apply to any individual representing an outside company and working in that installation. A very good way to identify, and thus prevent, possible accidents is to understand the basic characteristics of the surrounding materials or gases. Frequently, smoking or any open flame is not allowed . This would be especially true where *flammable* or explosive gases are present.

1. What does flammable mean? Which words tell you this?

_____

_____

2. Why is smoking a problem in sites where flammable or explosive gases are present?

_____

_____

11 12

3. Who are in-house employees? Is it fair that these rules apply to individuals representing outside companies as well as in-house employees?

5 Exercise

Mildred's hands get hot and sweaty. Her boss insists she wear leather gloves over her rubber ones. She reviews her manual. She finds the following information:

> **Gloves. The gloves worn when working on high-voltage circuits are made of rubber and should have long cuffs. The gloves typically resist at least 10,000 volts for a period of three minutes. Since this amount of voltage could easily arc between two points, the gloves should also resist cracking. Wearing leather gloves over the rubber insulating gloves can help prevent *punctures* and excessive wear. Some additional conditions may require additional protection other than rubber gloves, such as special rubber sleeves that reach to the elbow or shoulder. As with the rubber gloves and other protective clothing, the rubber sleeves should be inspected periodically for wear and damage.**

1. What are punctures?

_____

_____

_____

2. Describe how you determined this definition.

_____

_____

_____

_____

6 Exercise

Manual needs a scaffold. He is installing a ceiling fan in an office building. He wants to go home early, so he plans to stand on several paint cans stacked on end. His buddy, Larry, refuses to help him with this job. Manual gets angry at Larry. Larry finds the following information. He asks Manual to it:

Frequently, scaffolds have to be used when installing equipment such as cable tray, wire ways, and light fixtures. If used correctly, the scaffolds can be a valuable aid. However, all too often the scaffolds are *jury-rigged* platforms that have been erected too hastily or improperly, and, thus, become safety hazards. The dangerous practices may be due to ignorance about safe scaffolding practices. Regardless of the reason, OSHA can shut the job down if the established regulations are not followed.

1. Why did Larry refuse to let Manual stand on the paint cans rather than build a scaffold?

_____

_____

_____

2. What does jury-rigged mean? How do you know?

_____

_____

_____

_____

3. Besides the one given in this exercise, provide another example of a jury-rigged scaffold.

_____

_____

15

16

7 Exercise

Bob is a terrible record-keeper. This is a problem. The job he's on has had over 50 change orders. Thus, Bob needs all the information he can get on change orders. Bob decides to get organized.

During the progress of a job several things may happen to warrant change orders. The owner may decide to add, delete, or just change what they want done to their facility. Often times, however, change orders are a byproduct of discrepancies and oversights by the A/E during the design stages of the project. Change orders occasionally are a result of hidden conditions which may be uncovered in the progress of a job under-ground or in a building in the case of a remodeling job. The Change Order itself will be a detailed list or description, sometimes accompanied by revised drawings (plans) which will supercede other areas of the contract documents such as Addenda, Specifications, Schedules, Details, or Plans. in a job may supercede on dated earlier, so that it is necessary to keep up with the*chronological* order in which they are issued.

1. What does chronological mean? Which words tell you this?

2.) How can keeping records in this order help Bob?

8 Exercise

Marie's boss keeps saying "Think safety." Marie discovers a paragraph in her Wheels of Learning titled "Thinking safety." She is happy. Now, she'll finally learn what her boss wants her to think about!

> ***In order to work safely, it is necessary to think safely.*** **A fundamental procedure before using any tool is knowing how it works, what its function is, and some of the hazards involved in using it. When using any tool for the first time, read the operator's manual and become familiar with all safety precautions included in it. The safety instructions point out *potential* hazards that may be encountered and how best to avoid them. If you haven't used a particular tool in some time, refresh your memory and read the manual again.**

1. What does potential mean? Which words tell you this?

_____

_____

2. Why is it necessary to "think safety" before you begin using any tool?

_____

_____

_____

17 18

3. Describe a potential hazard in using each of the following:

a. channel locks _____

_____

b. reciprocating saw _____

_____

c. bolt cutters _____

_____

d. scaffold _____

_____

e. lineman's knife _____

_____

OBJECTIVE

At the end of this lesson, you will be able to use clues given to you by the author to define unknown words.

INSTRUCTION

Have you ever heard someone say "talking shop?" When two bankers discuss money, they are talking shop. When two cooks compare recipes, they are talking shop. When one electrician talks with another about wiring, they are talking shop.

All fields have words that are special to them. These words comprise the specialized and technical vocabulary of the field. They are known to the people in that trade. When these people talk together, they use these words. Someone new to the field has trouble understanding their conversation. For example, consider the word *ground*. You are an electrician. *Ground* means something altogether different from what it might mean to a gardener. Hearing you talk about grounding wires would confuse him.

New specialized and technical words make reading hard. Thus, authors often define their words the first time they use them. They do so in one of two ways. Sometimes they use words to signal a definition. These words are verbs. Examples of them are is, are, appears, concerns, indicates, refers to, and so forth.

Consider the following passage:

The LINEMAN'S KNIFE is a popular tool used for stripping wire.

CONCLUSION

The words "a popular tool used for stripping wire" tell about the lineman's knife The verb *is* indicated the definition was coming. When you see a new word followed by a verb signal, read carefully. What follows is probably the meaning of the new word.

Authors also define new words is byseparating either the new word or its definition from the rest of the sentence with punctuation. Such punctuation signals include parentheses (()), brackets ([]), dashes (—),or commas (,).

For example, consider the following passage:

Torpedo levels are available with a magnetized strip on one side for attachment to EMT and GRC. Especially helpful for measuring angles when bending conduit with a Chicago Bender, the torpedo level is also used for leveling electrical equipment (panels, conduit runs, etc.).

What are panels and conduit runs? They are types of electrical equipment that sometimes need leveling. How do you know ? They follow directly after the words electrical equipment and are set-off from the sentence by parentheses. Thus, when you see sets punctuation, read carefully. What follows may be a new term. By the same token, when you see a new term followed by a punctuation signal, read carefully. What follows is probably its definition.

1 Exercise

Jerry keeps asking his foreman why a job must be done one way and one way only. His foreman agrees that Jerry knows a better way to install the lighting equipment. But, he refuses to let Jerry do it this better way. Jerry starts to argue. Then the foreman gives Jerry some information to read.

These legal papers which may be standard forms or prepared by the architect may or may not be included in the set of specifications. They are considered to be very important, however, and are prepared with great care. An Invitation to Bid form and one entitled Instructions to Bidders are used to explain briefly the construction project, where the *contract documents* (working drawings and specifications) may be obtained, and a few details for the submission of the bid itself. It contains several provisions. One of them is the commitment on the part of the contractor to "furnish all labor, material, equipment, and service required to complete the proposed building for a sum of _____ dollars." Another provision is the right of owner to reject any or all bids. Another is that the successful bidder sign the contract within a certain number of days. Details of the Bid Bond are stipulated. This bond is required to cover the intention of the contractor to faithfully perform the work and fulfill the contract.

1. What are contract documents? How do you know?

2. What are the provisions of the forms of bid?

2 Exercise

Sally has never been very good at reading maps. On trips, her husband fusses all the time about her directions. She wonders how good she'll be at reading blueprints.

Electrical plans are seldom *diagrammatic* (showing exact routings, turns, elevations, etc.). It is more often the case that the connecting lines of circuitry are shown for design intent only. *Homeruns*, (those runs of cable, raceway, etc. that are run to a panel board or other power distribution means), are normally shown as a line with an arrow and a description of which panel and contained circuits. Even a panel as small as that in the average home would be *congested* and confusing if every circuit was drawn to it.

1. What does diagrammatic mean? What signal(s) tell you this?

2. What are homeruns?

3. What does conjested mean? What signal(s) tell you this?

3 Exercise

Jorge has been reading about the tools he will need on the job. He has found the following information especially useful.

The most common screwdriver types are the *slotted* and the *phillips head.* Some specific jobs may require the use of others; however, there is generally little application for them.

When using a slotted screwdriver, ensure that the tip does not extend beyond the edge of the screw and that the tips fills the slot of the screw. Never use the screwdriver as a scraper, pry bar, or chisel. Care should be taken when dressing the tip of a slotted head screwdriver. If a grinder is used, the tip should not be allowed to get too hot ("too hot" means hot to the temper and becomes soft. When using a grinder to dress a screwdriver, apply only light pressure and for very short periods of time.

1. What are the most common screwdriver types? What signal(s) tell you this?

2. What does too hot mean? How do you know?

3. How are screwdrivers misused?

23 24

4 Exercise

Manny's partner was cutting wire yesterday. He asked Manny to hand him his diagonals. Manny had no idea of what his partner wanted. He was really embarrassed. He never wanted this to happen again. Manny finds the section in his training manual on tools. He reads the following.

> **Several variations of these pliers may be found in the electrician's tool pouch. Used primarily for cutting wire and various other cutting operations, these pliers (sometimes known as diagonals or *dikes*) have two basic configurations. The cutting head may be straight or angled. The angled cutting head often enables cuts closer to a flat surface.**

1. What is another name for diagonal cutting pliers? What signal(s) tell you this?

_____

2. What is the difference between the angled cutting head and the straight one?

_____

_____

_____

3. Describe a time when it would be appropriate to use diagonals with a straight head.

_____

_____

_____

4. Describe a time when it would be appropriate to use diagonals with a flat head.

_____

_____

_____

5 Exercise

Manny also finds the following information about stripper/ cutters. These are also used when wiring. He decides to read about them too. He won't be caught again!

Stripper/cutters, often referred to as strippers, are used to strip and cut wire. Available in at least three different sizes for electrical construction and electronics technical work, strippers usually are provided with plastic dipped handles. The size used by most electricians will strip No. 10, 12, 14, 16, and 18 wire.

1. By what name are stripper/cutters often called? Which words tell you this?

_____

_____

2. Why are three different sizes of these cutters needed?

_____

_____

_____

6 Exercise

Marzy plans to buy a hacksaw. Her boss says there's one thing she must do. The tooth pitch needs to be such that a minimum of two teeth will be in contact with whatever she's working on. Marzy doesn't know what the term tooth pitch means. She checks her manual. This is what she finds:

> **Light enough for overhead cutting, the hacksaw is a very versatile cutting tool. Used primarily for cutting steel, the hacksaw may be used for cutting other materials as well. The saw blades are available in 18, 24, and 32 teeth per inch configurations. At least one manufacturer produces a blade that has all three configurations. The purpose of this blade is to use the 32 tooth/inch end of the blade to get the cut started and the balance of the blade for coarser cutting. A good tip for selecting the proper *tooth pitch* (teeth per inch) of a hacksaw blade is stated as follows: Make sure that the tooth pitch is selected so that a minimum of two teeth are in contact with work (the piece being sawed) at all times.**

1. What is tooth pitch? How do you know?

_____

_____

_____

2. What's another name for the piece being sawed? What signal(s) led you to this name?

_____

_____

_____

7 Exercise

Joel has been studying the history of the electrical field, he discovers two interesting facts. One of these was in the story part of the history. The other was on the time line. These are:

The development of large structures, the building of *aqueducts* (water piping systems), and the making of roads had the advantage that all the components were visible. It was difficult for people of this time period of history to understand theoretical science. Therefore, the development of electrical theory was slower in coming than were other sciences. For example, observing the fact that water runs down hill is not as complicated as observing that electrons flow from negative to positive. The development of electrical theory was hampered because of the invisibility of current, voltage, and magnetism.

1850 A *submarine* (underwater) telegraph cable was laid across the English channel.

1. What are aqueducts? How do you know?

2. Why did the development of electrical theory slow during the time aqueducts were first being used?

3. What does submarine mean?

8 Exercise

Bob needs information on how to install an electric range. He is a new electrician working maintenance in the plant cafeteria. In the NEC, he finds the following:

> **Connection of electric ranges and electric clothes dryers utilizing a *grounded* (neutral) *conductor*, if cord-connected, shall be made with 4-conductor cord and 3-pole, 4-wire, grounding-type plug caps and receptacles.**

1. What is another name for a grounded conductor? How do you know?

9 Exercise

Edward is about to begin wiring a hospital. He is concerned that one area sometimes has water on the floor. According to the NEC, he finds:

> ***Wet locations*** **are those patient care areas that are normally subject to wet conditions, including standing water on the floor, or routine dousing or drenching of the work area. Routine housekeeping procedures and incidental spillage of liquids do not define a wet location.**

1. What are wet locations? Which word(s) singalled a definition was coming?

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_____

_____

2. Why should an electrician be concerned about these areas?

_____

_____

_____

_____

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10 Exercise

Wilfred's foreman has told him their next job. It will be wiring a residential custodial care facility. A new day care is being built next to Wilfred's apartment. He wonders if this is where he will be working.

Residential custodial care facility: A building, or part thereof, used for the lodging or boarding of four or more persons who may be incapable of self-preservation because of age, or physical or mental limitation. This includes facilities such as homes for the aged, *nurseries* (custodial care for children under 6 years of age), and mentally retarded care institutions. Day care facilities that do not provide lodging or boarding for institutional occupants are not classified as residential custodial care facilities.

1. What are nursuries? How do you know?

2. Will Wilfred be working near his apartment? How do you know?

By the end of this lesson, you will be able to define unknown words through examples in the sentence.

OBJECTIVE

INSTRUCTION

What do diamonds, rubies, and emeralds have in common? They are all precious gems. They are used in jewelry. Your skill in what these white, red, and green stones have in common can help you find the meanings of unknown words.

For example, consider the following sentence:

This article covers the installation of wiring and equipment in the areas comprising fixed or floating piers, wharfs, docks, and other areas in marinas, boatyards, boat basins, and similar establishments that are used, or intended for use, for the purpose of repair berthing, launching, sorage, or fueling of small craft and the moorage of floating buildings.

The words "marinas, boatyards, boat basins, and similar establishments" comprise a series. Each item in the series is equal. You can figure out that marinas means places where boats are kept. You do this by looking at the other words in the series. The next time you find a word in a series, look at the words that come before and after it. See if you can make connections between those words. Do they seem like this too? If so, then the unknown word probably means something similar as well.

1 Exercise

Gene is about to begin work on an aircraft hanger. Before the first day of work, he gets his text. He reads information found in the NEC.

> **An aircraft hanger is a location used for storage or servicing of aircraft in which gasoline, jet fuels, or other *volatile flammable* liquids or flammable gases are used. It shall not include locations used exclusively for aircraft that have never contained such liquids or gases, or that have been drained and properly *purged.***

1. What does volatile flammable mean? How do you know?

_____

_____

_____

2. What does purged mean? Which words tell you this?

_____

_____

_____

2 Exercise

Horace has just started a job in a hospital. He checks to see if there are enough outlets. The NEC provides this information:

> **General care areas are patient bedrooms, examining rooms, treatment rooms, clinics, and similar areas in which it is intended that the patient shall come in contact with ordinary appliances such as a nurse call system, electrical beds, examining lamps, telephone, and entertainment devices. In such areas, it may also be intended that patients be connected to *electromedical devices* (such as heating pads, electrocardiographs, drainage pumps, monitors, otoscopes.)**

1. What are electromedical devices? How do you know?

_____

_____

_____

_____

36

35

3 Exercise

Kahn is about to begin installing emergency system circuits. He is especially interested in emergency lighting. Thus, he reviews sections of the NEC.

> **Emergency illumination shall include all required means of *egress* lighting, illuminated exit signs, and all other lights specified as necessary to provide required illumination. Emergency lighting systems shall be so designed and installed that the failure of any individual lighting element, such as the burning out of a light bulb, cannot leave in total darkness any space which requires emergency illumination.**

1. What does egress mean? How do you know?

_____

_____

_____

_____

2. What words mean the same as exit? How do you know?

_____

_____

_____

4 Exercise

Jana hurt her head while installing receptacles. She doesn't want her foreman to report the accident. She reads the following in her text. Then she withdraws her complaint about the report.

> **If medical attention is necessary because of an injury a written report is required. This written report will usually be completed by the supervising journeyperson. If the injury does not require medical attention, it should still be reported to the supervisor, since an injury that is not serious initially may develop serious complications later. If an injury is unreported, it may be impossible to receive *workman's compensation* or other benefits if the injury were to get worse in the future.**

1. What is workman's compensation? How do you know?

2. Why might a worker not want an accident report filed?
   Why should a report be filed?

5 Exercise

Jim is starting work as an electrician. He has been out of work for several months. He is concerned about the tools he will need on the job. He reviews his student manual. He finds the following information:

> **Many of the tools used on the job each day are contractor supplied tools. These tools include all power equipment used, all of the power tools used, all of the climbing equipment used as well as many of the handtools such as benders, fish tapes, knockout cutters, large wrenches, extension cords, etc. Also, many *consumables* such as saw blades, taps, marking apparatus, and personal protective equipment are also most often supplied. However, do not think that all of this is free. A very significant percentage of the contractor's cost is consigned to the procurement, use, and replacement of these tools. Often the simple fact of having and using these tools also increases costs in other areas such as repairs and insurance. Most any contractor would love to have in profit what this area of his business costs. So take extraordinary care of these tools. It will help the contractor and thereby help you.**

1. What are consumables? How do you know?

2. Why are these not "free" if the worker does not have to pay for them?

3. How does taking care of consumables "help the contractor and thereby help you?"

6 Exercise

Kirk is wiring an elevator. He consults the NEC for information.

> **This article covers the installation of electric equipment and wiring used in connection with elevators, *dumbwaiters*, escalators, moving walks, wheelchair lifts, and stairway chair lifts.**
>
> **All live parts of electric apparatus in the hoistways, at the landings, or in or on the cars of elevators and *dumbwaiters* or in the wellways or the landings of against accidental contact.**

1.) What is a dumbwaiter? How do you know?

_____

_____

_____

_____

7 Exercise

It's Judy's birthday. Her husband plans to buy her one of the tools on her "Wish List." On the top of Judy's list is a right angle adapter for her auger bit. Her husband decides he better learn what a right angle adapter is. From Judy's text, he learns the following:

> **Drill motors are available in small (1/4" and 3/8" chuck sizes) sizes up to larger, 1/2" Hole Shooter size. Larger drill motors are available with a "side handle." Side handles provide the user an additional gripping point to help prevent the drill motor from being twisted out of their hands if the bit becomes jammed spots.**

1. What does inaccessible mean?

_____

_____

_____

2. Describe a common time when Judy might use a right angle adapter.

_____

_____

_____

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